Claims

1. A method of extending a dynamic range of an X-ray imaging system, such method comprising the steps of:

detecting first and second substantially identical samples of each of a plurality of X-ray beams;

amplifying each first sample of the substantially identical samples using a first gain value;

amplifying each second sample of the substantially identical samples using a second gain value; and

forming an X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value.

2. The method of extending a dynamic range of an X-ray imaging system as in claim 1 wherein the step of detecting the plurality of X-ray beams further comprises providing a scintillating element for converting each of the plurality of X-ray beams into visible or near-visible light.

3. The method of extending a dynamic range of an X-ray imaging system as in claim 2 further comprising disposing first and second photodiodes on each scintillating element for detecting the visible or near-visible light from the scintillating element.

4. The method of extending a dynamic range of an X-ray imaging system as in claim 1 further comprising forming a first X-ray image from the detected X-ray beams amplified by the first gain value and a second X-ray image from the detected X-ray beams amplified by the second gain value.

5. The method of extending a dynamic range of an X-ray imaging system as in claim 1 further comprising forming a single X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value.

6. The method of extending a dynamic range of an X-ray imaging system as in claim 5 further comprising displaying pixels from the detected X-ray beams amplified by the first gain value with a first color value and pixels from the detected X-ray beams amplified by the second gain value using a second color value.

7. The method of extending a dynamic range of an X-ray imaging system as in claim 5 further comprising displaying pixels from the detected X-ray beams amplified by the first and second gain values normalized to a single gray-scale pixel range.

8. An apparatus for extending a dynamic range of an X-ray imaging system, such apparatus comprising:

means for detecting first and second substantially identical samples of a plurality of X-ray beams;

means for amplifying each first sample of the substantially identical samples using a first gain value;

means for amplifying each second sample of the substantially identical samples using a second gain value; and

means for forming an X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value.

9. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 8 wherein the means for detecting the plurality of X-ray beams further comprises means for converting each of the plurality of X-ray beams into visible or near-visible light.

10. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 9 wherein the means for converting each of the plurality of X-ray beams into near visible or near-visible light further comprises a scintillating element.

11. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 10 wherein the scintillating element further comprises a single crystal or a polycrystalline material.

12. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 10 wherein the scintillating element further comprises a ceramic material.

13. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 10 wherein the scintillating element further comprises plastic.

14. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 9 further comprising means for detecting the visible light disposed on the means for converting.

15. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 8 further comprising means

for forming a first X-ray image from the detected X-ray beams amplified by the first gain value and a second X-ray image from the detected X-ray beams amplified by the second gain value.

16. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 8 further comprising means for forming a single X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value.

17. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 16 further comprising means for displaying pixels from the detected X-ray beams amplified by the first gain value with a first color value and pixels from the detected X-ray beams amplified by the second gain value using a second color value.

18. An apparatus for extending a dynamic range of an X-ray imaging system, such apparatus comprising:

a detector array adapted to detect first and second substantially identical samples of each of a plurality of X-ray beams;

a first amplifier adapted to amplify each first sample of the substantially identical samples using a first gain value;

a second amplifier adapted to amplify each second sample of the substantially identical samples using a second gain value; and

an image processor adapted to form an X-ray image from the detected X-ray beams amplified by the first gain value

and from the detected X-ray beams amplified by the second gain value.

19. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 18 wherein the detector array further comprises a scintillating element adapted to convert each of the plurality of X-ray beams into visible or near-visible light.

20. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 19 wherein the scintillating element further comprises a single crystal or a polycrystalline material.

21. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 19 wherein the scintillating element further comprises a ceramic material.

22. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 19 wherein the scintillating element further comprises plastic.

23. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 19 further comprising a first photodiode and a second photodiode disposed on the scintillating element for detecting the visible or near-visible light.

24. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 18 further comprising a first X-ray image for displaying information from the detected X-ray beams amplified by the first gain value and

a second X-ray image for displaying information from the detected X-ray beams amplified by the second gain value.

25. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 18 further comprising an image processor adapted to form a single X-ray image from the detected X-ray beams amplified by the first gain value and from the detected X-ray beams amplified by the second gain value.

26. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 25 wherein the single X-ray image further comprises pixels from the detected X-ray beams amplified by the first gain value with a first color value and pixels from the detected X-ray beams amplified by the second gain value using a second color value.

27. The apparatus for extending a dynamic range of an X-ray imaging system as in claim 25 wherein the image processor further comprises a normalizing processor adapted to normalize the detected X-ray beams amplified by the first and second gain values to a predetermined pixel range.

28. A method of extending a dynamic range of an X-ray imaging system, such method comprising the steps of:

detecting first and second substantially identical samples of a non-coincident portion of an X-ray beam within each of a plurality of regularly spaced detector areas;

amplifying each of the plurality of detected portions using a first gain value for the first samples of the substantially identical samples and using a second gain

value for the second samples of the substantially identical samples; and

forming an X-ray image from the amplified portions at the first gain value and from the amplified portions at the second gain value.

29. A method of extending a dynamic range of an X-ray detector, such method comprising the steps of:

providing an X-ray to optical converter;

coupling a first detector of a first gain value to the converter;

coupling a second detector of a second gain value to the converter; and

selectively coupling the first and second detectors to an image reconstruction processor based upon a magnitude of an X-ray signal impinging upon the converter.